The Pan-Pacific Entomologist

Vol. VII, No. 3 January, 1931

CHARLES FAYETTE McGLASHAN

BY E. O. ESSIG

With the passing of Charles Fayette McGlashan, the West has lost one of its most interesting men who link the present with the old and colorful past. Born near Jamesville, Wisconsin, August 12, 1847, he crossed the plains in an ox wagon and arrived in California in September, 1854. Later he attended the Satoyome Institute at Healdsburg, California, 1862-1865, and finished his education at Williston Seminary, Easthampton, Massachusetts, 1868-1870. He prepared for law and the many other occupations which he pursued in after life as a school teacher, editor, historian, and amateur scientist. As principal of the Placerville high school in 1871-1872, he took a class four miles to Negro Hill to look through a telescope owned by a Mr. Old.eld,[1] an Englishman and a miner and an ardent entomological collector. This visit was the beginning of two passionate hobbies which at once seized upon the budding scientist. The first was the study of astronomy, which he pursued with such thoroughness that it later won him a place as director of the Chabot Observatory, Oakland. The other was entomology. It happened that, on the day of his visit to the abode of Mr. Oldfield, a large number of moths emerged in a breeding cage and they so fascinated him that, after receiving all the instructions possible in the art of collecting and rearing moths and butterflies, he became fired with entomological enthusiasm which never ceased. After he became principal of the Truckee schools, July 12, 1872, he devoted much of his time to collecting, rearing, and distributing Lepidoptera. His work attracted attention of many entomologists. Henry Edwards visited him and taught him how to sugar for moths, and during the twelve years from 1875-1887 McGlashan sent him the most of the moths reared and collected, so that many specimens in the Edwards collection, now at the Ameri-

1 Oldfield was an amateur entomologist who donated a collection of Lepidoptera to the California Academy of Sciences, San Francisco. The specimens were later destroyed by the earthquake and fire of April, 1906.

can Museum of Natural History, New York, bear the locality "Truckee." During the years 1884-1887 he also collected eggs, larvæ, and pupæ of butterflies for W. H. Edwards, who gave him much information as to securing eggs and rearing the caterpillars of butterflies. In turn Edwards determined all of the butterflies in his collection. Albert Kœbele collected with McGlashan at Truckee in 1886. During the early eighties specimens were collected there by B. Neumogen, Gamble Geddes, Herman Strecker, W. G. Wright, James Behrens, J. J. Rivers, and others. As a result of his endeavors Mr. McGlashan amassed a collection of twenty thousand specimens, especially rich in butterflies. Many specimens were preserved in patented, wholly glass cases, each of which is described as follows:

"The case is made wholly of glass, preferably in the form of a six-sided box. It is made in sections, each side being a separate piece—that is to say, the top is one piece of glass, its bottom another piece of glass, and each of its sides one piece of glass. The meeting edges of each piece are beveled or chamfered to an angle to suit the particular case, and these joints are thoroughly cemented together, so that the sections of the case become practically a single piece, forming a hollow shell or casing which is permanently and hermetically sealed. The specimens are pinned to a strip of cork cemented to glass." [2]

Beginning in 1912 and continuing until the World War in 1915, he taught his daughter, Ximena McGlashan,[3] how to collect and rear butterflies and moths, how to sugar for moths, and the methods of disposing of the adults. A butterfly farm was established at Truckee, a correspondence course for amateur entomologists given to hundreds of pupils, and a monthly magazine [4] issued.

His collections are still maintained at his home in Truckee.

For him Rivers named *Lemonias macglashani* which proves to be a form of *Euphydryas chalcedona* (Dbldy. and Hew.), and Henry Edwards named *Hepialus macglashani,* a synonym of *H. pulcher* Grote.

McGlashan died at his home at Truckee, January 6, 1931, and was cremated at Sacramento.

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2 Pacific Rural Press, Vol. 35, p. 378 (April 28, 1888).
3 Now Mrs. J. C. Howard.
4 The Butterfly Farmer, Vol. 1, No. 1 (September, 1913) to Vol. 1, No. 12 (August, 1914), 208 pages.

To his fellow citizens of Truckee he was perhaps best known as a competent school teacher, a most successful criminal lawyer, an editor [5] of reputation, a searcher of the stars, a collector and breeder of butterflies and moths, and a historian of the hardy pioneering days. To the world at large his name will be perpetuated as the historian of the famous Donner tragedy which occurred in the high Sierras near his home at Truckee in the winter of 1846. His book of 261 pages entitled "History of the Donner Party," a tragedy of the Sierras, was first published by Bancroft, San Francisco, in 1880. A reprint by the same company appeared in 1881 and subsequent reprints by Crocker, Sacramento, 1907, and Carlisle, San Francisco, 1918.

While at Santa Barbara he became interested in a system of railroad telegraph signals and published a small paper of eight pages entitled: "McGlashan's train telegraph. A certain method of preventing railroad collisions. Telegraph offices upon cars." No date is given.

NOTES ON DIPTERA ATTACKING MAN IN SEVIER COUNTY, UTAH

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The following species were collected principally on the writer while in the valley and canyons collecting birds and mammals in 1929. The hunter became the hunted, so to speak.

Aedes dorsalis (Meigen).—These mosquitoes began to appear in Salina in May. By July, when the first crop of hay was being cut, I saw them in great numbers on the work horses in fields near the river. They attacked man persistently, too. Upon asking a farmer where the mosquitoes bred, he replied, "I don't know where they breed, but I do know where they feed." These mosquitoes seemed to attack most viciously at dusk.

Aedes campestris D. and K.—This species mingles with *dorsalis* throughout the state where collections have been made. Several specimens were taken in Salina.

[5] He edited the Truckee Republican and the Santa Barbara Press.

Aedes vexans (Meigen).—Late in July while climbing from the experiment station in the mountains east of Salina (elevation 7800 feet) to the higher ridges, I encountered frequent small swarms of a dark species which followed persistently, settling principally on my back and legs. They were more numerous in protected places near trees and bushes where the breezes were less pronounced. Unfortunately I had left my cyanide bottle in camp, but I easily caught a score or more in a vial of alcohol by putting the open vial over them. Because of this wetting, positive identification was very difficult.

Culex tarsalis Coq.—I collected several females (and two males) in June on the walls and ceiling of a bedroom at night. They did not attack us before we slept. They doubtless did so later in the darkness.

Symphoromyia hirta Johnson.—At the experiment station in late July we were frequently attacked by these flies darting to our necks, faces and hands with a low hum, and quickly beginning to drill. This drilling process was rather painful, but no swelling resulted and the tingling was of short duration. These flies lost all caution when boring for blood, and could be easily picked up or crushed. Hence collecting was an easy matter.

Silvia quadrivittata Say.

Chrysops fulvaster O. S.—Moderate numbers of these two species, the latter more common, attacked me promptly when walking through the grass and brush by the Sevier River. They were difficult to capture in hand until well engaged in biting. Only a few specimens were taken, mainly because of my reluctance to fight the swarms of mosquitoes longer than necessary.

Culicoides varipennis Coq.—On hot afternoons in the valley, especially on the leeward side of hills, these small flies appeared in swarms and crawled under hat band, down the neck, etc., biting promptly. Killing apparently did no good, as others instantly took their places.

The writer is indebted to Dr. O. A. Johannsen, Professor of Entomology at Cornell University, and Mr. D. M. Rees, Zoölogy Department of the University of Utah, for the determination and verification of the species listed.

NEW SPECIES OF APHODIUS AND MALACHIUS FROM CALIFORNIA

(Coleoptera)

BY R. E. BARRETT

Saticoy, California

Aphodius vandykei Barrett, n. sp.

Oblong, convex, black, shining, elytra black with intervals 2 to 5 and part of 6 yellow. Head entirely black, moderately convex, without trace of tubercles, surface rather finely closely punctate; clypeus feebly emarginate, the angles broadly rounded, sides arcuate, genæ moderately prominent, not as obtuse as in *cruentatus*; antenna brownish, club piceous. Thorax one and one-half times as wide as long, slightly narrower in front, sides feebly arcuate, hind angles distinct but obtuse, base arcuate, basal marginal line entire and more distinct than in *cruentatus*; disk convex, punctuation fine and dense slightly denser and finer at the sides. Scutellum small, black. Elytra at base not quite as wide as thorax, humeri distinct, with a small acute tubercle; striæ moderately deep, rather finely punctate, the striæ red where the intervals are yellow, intervals very slightly convex, punctuation fine and sparse, the first or sutural interval black, intervals 2 to 5 and part of 6 yellow except the apical one-eighth which is usually black or dark brown, the intervals from 6 to the side black. Mesosternum not carinate between the coxæ. Metasternum sparsely evenly punctate. Abdomen indistinctly punctate. Anterior tibiæ smooth in front, tridentate externally, finely crenate above the upper external tooth, piceous, first tarsal segment as long as the second, piceous. Middle tibiæ and tarsi piceous. Posterior femur rather densely punctate, black, tibiæ with unequal spinules, piceous, the first tarsal segment distinctly longer than the next three, piceous. Length, 4.5 to 6.0 mm.; breadth, 2.25 to 3.0 mm.

Holotype, No. 2984, in the Museum of the California Academy of Sciences. Numerous paratypes in my own collection. All were taken by me from nests of the wood rat, *Neotoma,* in the East Fork of Santa Paula Canyon (2500 feet elevation), Ventura County, California, January 26, 1931.[1]

A triangular black spot on the elytra is noticeable on many specimens, the base of the triangle being at the base of the elytra. This black spot is due to the transparency of the elytra

1 A number of specimens of the same species were taken by me and my students from the flotsam in a reservoir below the Sequoia National Park during May, 1929.—Edwin C. Van Dyke.

and the manner in which the wings are folded. Specimens preserved in alcohol are noticeably darkened. No sexual differences are noticed in the series at hand.

By Horn's Monograph this species runs to *terminalis* and *cruentatus* in Group I-d. It may readily be separated from *terminalis* by the small acute tubercle on the humeri, the first tarsal segment of the posterior legs being longer than the next three, the yellowish markings on the elytra, and by being in general larger. From *cruentatus* it may best be separated by color, smaller size, lack of tubercles on the head, and shape of the humeri.

This is the fourth *Aphodius* from *Neotoma* nests, *neotomæ* Fall, *davisi* Fall, and *sparsus* Lec. having been previously described from this habitat.

I take pleasure in naming this species after Dr. E. C. Van Dyke.

Malachius californicus Barrett, n. sp.

Moderately elongate, parallel or slightly wider posteriorly, from above metallic blue bordering on green. Head with two frontal and one small vertical impression, finely punctate, shining metallic bluish green, antenna eleven-segmented, black; male—segments 1 and 2 cylindrical, 3 triangular twice as long as the second, 4 to 10 pectinate, branch on segment 4 one-half as long as branch on segment 6, branch on segment 5 equal in length to branch on segment 10, branches on segments 6 to 9 equal in length; female—segments 1 and 2 cylindrical, segments 3 to 10 serrate; undersurface of the distal half of the first segment and the undersurface of the second segment yellow in both sexes. Prothorax distinctly wider than long, glabrous, shining, broadly rounded, uniformly colored. Elytra shining, scabrous, apex not appendiculate in either sex. Undersurface of body and legs dark green bordering on black, pubescence fine, yellow. Length, 3.5 to 4.0 mm.; breadth, 1.5 to 2.0 mm.

Holotype, male, No. 2985, in the Museum of the California Academy of Sciences. Allotype, female, and one paratype in my collection. Described from three specimens collected by myself in Marin County, California, April 18, 1926.

In Horn's Synopsis of the Malachiidæ of the United States this species runs to the group in which the male antenna is pectinate and the apex of the elytra are not appendiculate. It may readily be separated from *mixtus* and *ulkei* by its uniform metallic bluish-green color.

NOTES ON PHÆDON

BY MELVILLE H. HATCH

Dr. H. C. Fall (Pan-Pac. Ent., V, 1929, pp. 145-152) has pronounced invalid the nine new species of *Phædon* that I described (l. c., 1928, pp. 44-47, 59-62). Of these Mr. Charles Schæffer (Bull. Brook. Ent. Soc., XXIV, 1929, pp. 286-287) has declared *P. carri* Hatch valid. For the present, *P. vancouverensis* Hatch can likewise be considered distinct. It is separated from *oviformis* Lec. by characters of no less moment than those considered valid by Schæffer; Fall, moreover, was unable to report intermediates between it and *oviformis*.

Since Dr. Fall asserts that he has seen intermediates, *P. punctatus* and *vandykei* Hatch can be regarded as varieties of *prasinella* Lec., and *dietrichi* Hatch a variety of *viridis* Melsh. (*æruginosus* Suffr.; *microreticulatus* Hatch*). These differ by clear-cut characters, and, until the matter can be given more detailed study than Dr. Fall has obviously given it, the progress of our knowledge is better served by keeping the several varieties separated. As a third member of the *viridis* group, I announce the var. **oklahomensis** nov. It is characterized by the almost complete obsolescence from the interstriæ of both rugosity and micropunctulation and by the very fine punctation of the disk of the pronotum. The type is from Chickasha, Oklahoma, in my collection.

The case of *P. niger* Hatch † is difficult. It is most closely related to *americanus* Schæffer (*armoraciæ* Hatch and Fall, nec L.) and it must replace that name if it be eventually proved to be cospecific with it. It is characterized by jet-black elytra and convex interstriæ, and I have two specimens that fulfill

* Dr. Fall intimates that I was not entitled to rely on the published descriptions of viridis Melsh. and purpurea Linnell (purpurescens Hatch) but that I was under obligation to consult the types. I can admit no such obligation. Species exist not by virtue of the characteristics inherent in the type, but by virtue of such of those characteristics as have been published. When specimens exist that differ from published descriptions of previously described species in reasonably definite fashion the obligation is to describe them as new. The occasional synonomy so produced is much preferable to the announcement of really new species under old names—a practice that, at best, is frequently unavoidable.

† Dr. Fall's proposal to ignore the type of this form is reminiscent of the reputed habit of the older naturalists of throwing out specimens that didn't "fit." How much of the clarity for which Dr. Fall's monographs are so justly famous has been obtained at the price of the suppression of a portion of the data?

both these requirements. *Americanus* is characterized by more or less metallic elytra and flat interstriæ. A third form, which I name **planus** sp. nov. (Type and four paratypes: King County, Washn., Evans Creek, May 11, 1929. M. H. Hatch, in my collection), is characterized by jet-black elytra and flat interstriæ. So far I have not taken *americanus,* as above defined, in western Washington, and it is possible that *planus* replaces it in this area. All three of these forms possess a nearly similar elytral microsculpture, are closely related, and may eventually be shown to be varieties or subspecies of a single species.

Two corrections in my second paper on *Phædon* (l. c., pp. 59-60) should be noted. The division "A^2" of my table should read "elytral intervals not microreticulate." *Cochleariæ L.* is erroneously included under the species without a series of larger punctures on the second interstria, although the larger punctures are very faintly indicated in my material which, moreover, exhibits a definite transverse rugosity of the interstriæ.

Swarming of Two Species of Diptera

On March 22, 1931, while collecting by the Salinas River at Templeton, Monterey County, California, I noted an unusual gathering of *Odontomyia pilosa* Day. They were swarming on a cluster of stones projecting a little above the surface of the water, there being perhaps one or two hundred individuals altogether. Some were resting on the stones while others flew back and forth close over them with a rather loud humming noise, much like that produced by certain Bombyllids when hovering; perhaps a mating flight.

On the bank near where these Stratomyids were gathered was a patch of *Bæria chrysostoma* on the flowers of which were great numbers of the little Bombyllid, *Ploas atratula* Loew. This species is always common on these Bæria flowers, but I have never seen them in anything like such numbers.—E. P. Van Duzee.

NOTES ON POGONOCHERUS

BY RALPH HOPPING
Vernon, B. C.

Referring to Mr. Linsley's excellent review of the genus *Pogonocherus* in the PAN-PACIFIC ENTOMOLOGIST for October 1930. The restricted distribution of some of the species seems to call for comment. A few hosts may also be added to those given by Mr. Linsley.

Pogonocherus propinquus Fall.—This species has been bred by us from not only *Pinus ponderosa* Laws, but from *P. contorta* Loudon and *P. monticola* D. Don. at Midday Valley, near Merritt, B. C., and at Trinity Valley, near Vernon, B. C.

Pogonocherus arizonicus Schffr.—This species also occurs in California, as well as Arizona. One specimen was taken by the author near Tahoe, California. It is fairly common for species of Arizona and New Mexico to be taken as far north as southern British Columbia.

Pogonocherus pictus Fall.—We have bred this species in numbers from *Pinus ponderosa* Laws at Midday Valley, B. C., and from *Larix occidentalis* Nuttal at Trinity Valley, B. C.

Pogonocherus mixtus Hald.—I have examined one specimen of *mixtus* from Salmon Arm, B. C. Other specimens in my collection are from Leduc and Edmonton, Alberta; Minnesota, and the Eastern States.

Pogonocherus salicicola Casey.—Typical specimens of this species have been bred from *Pinus ponderosa* Laws at Midday Valley, B. C.

Pogonocherus penicillatus Lec.—This is our commonest species and is frequently bred by us from *Picea engelmanni* Engel., in our cages at Lorna, B. C. It is apparently a Rocky Mountain species breeding in spruce, extending from Alaska to British Columbia and the Rocky Mountain States to Colorado.

Pogonocherus oregonus Lec.—Three specimens have been taken in British Columbia at Vernon, Creston, and Midday Valley.

Pogonocherus crinitus Lec.—Although we have not taken this species it has been seen from Vancouver Island, as stated by Mr. Linsley. The host *Quercues garryana* Hook. does not exist on the mainland of British Columbia.

From the above notes it may be seen that seven, or one-half the known species, are found in British Columbia, and several new hosts are listed.

A Correction

Since the publication of an article on *Pogonocherus* and *Ecyrus* in the last number of the Pan-Pacific Entomologist, two errors in synonomy have come to my attention. The first of these is in regard to the specific standing of *Pogonocherus parvulus* Lec. I accepted Horn's declaration as set forth in his revision,[1] and later restated by other writers, that *P. parvulus* was merely a small form of *P. mixtus* Hald. I now find, through the kindness of Dr. H. C. Fall, that *P. parvulus* is not only a valid species, but is the form that was later described by Casey as *P. salicicola.* Dr. Fall writes, "*Pogonocherus salicicola* Casey is the same as *P. parvulus* Lec. which is itself a good species and distinct from *P. mixtus* Hald. Since the publication of Casey's *salicicola,* I have carefully examined the two type specimens in the Le Conte collection and find them to agree in all essentials with Casey's species."

Ecyrus fasciatus Ham. should be considered a valid species and not a variety of *E. dasycerus* Say. Of this species Dr. Fall writes, "I have an example of *E. fasciatus* Ham. which has been compared with the type, and found to agree perfectly. It is more robust than *E. dasycerus,* with a denser pubescence of a different pattern, the elytra with scattered fine erect hairs, quite different from the oblique short ones of *E. dasycerus,* and with rounded elytral apices."—E. Gorton Linsley.

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1 Horn, G. H., Trans. Am. Ent. Soc., VII, 1878, p. 42

NOTES ON EGG HATCHING—LARVAL, PUPAL, AND ADULT DEVELOPMENT IN LINA SCRIPTA (FABR.)

(Coleoptera: Chrysomelidæ)

BY ESTHER GUTHRIE, M.A.
Woodland, California

Early in June 1930, a twig from a poplar tree was brought into the Stanford entomology laboratory, with a number of the pupæ of the beetle *Lina scripta* (*Melasoma scripta*) hanging to it. On June 14, a number of adults, spotted and black, emerged from these pupæ. A pair of spotted beetles was isolated and placed in a glass jar for the purpose of observation. The pair was supplied continuously with fresh young poplar leaves. Room temperature, during the course of observations, varied from 69 to 70 degrees Fahrenheit.

On June 22, eight days after emergence, the pair mated. On June 26, twelve days after emergence, fifty-nine eggs were deposited on the underside of the leaf. The eggs were attached to the surface by an adhesive secretion in an oblique position, occasionally one lying over the other. They were oval and of a deep yellow color. This was the first of several batches of eggs oviposited by the female.

Hatching began July 2, the period of incubation being thus six days. Just before hatching, the embryo is clearly discernible through the smooth, tough shell. A double row of dorso-lateral black spots, each basal to a single black bristle, is conspicuous. At regular intervals, peristaltic movements of the embryo occur, which, as they become more vigorous, cause the egg shell to split along the side, near the anterior end. As these movements continue, the opening is widened. When the split is quite long, the posterior tip of the abdomen of the larva is drawn forward and under, while at the same time the thorax and first two abdominal segments are pushed against the split in the shell. Each time this "pushing" occurs, the bristles stand erect and the skin becomes turgid.

Conspicuous on the larva are openings of two rows of dorso-lateral glands, two pairs on the thorax and seven pairs on the abdomen. When the larva is disturbed the membrane of the openings of the glands is everted and a secretion with an odor similar to Prussic acid exudes. As the larva is pushing itself through the split in the shell, the skin becomes turgid and this membrane often everts, discharging the milky secretion. As the body relaxes, the membrane is retracted.

The "pushing" continues until the split is widened sufficiently for the extrusion of the larval body. At the tip of the abdomen, there is a sticky disk by means of which the larva attaches itself to the inside of the shell, while the body is erected perpendicularly from this point and moved about in various directions. When pigmentation becomes evident on legs, head, and thorax, the larva curves forward and comes to rest with only an occasional movement, until pigmentation is complete.

Pigmentation takes place by degrees. The mandibles, simple eyes, claws, and bases of the large bristles become pigmented in the embryo. In the larva, the sequence is as follows: thorax, segments of the abdomen, and the tubercles at the openings of the glands.

There are four evident pouches on the thoracic segments adjoining the tubercles. These are very large and soon become yellow and turgid with fluid, while those on the abdomen remain brownish black.

The first moult occurred July 5, the first in-star thus lasting three days. The larvæ, preparing to moult, cease to feed and move in such a way as to indicate that the body is being pulled away from the larval skin. At the same time the four prominent yellow pouches become very light in color. The larval skin splits through the head, thorax, and first abdominal segments. Immediately after ecdysis the larva is yellow and remains inactive until pigmentation sets in and becomes complete.

Three days later, July 8, the second moult occurred. From this time until prepupation the larvæ fed voraciously. Four

days later, July 12, the larvæ ceased feeding, the four yellow pouches became white, and the prepupæ attached themselves to the surface by means of the sticky disk at the tip of the abdomen, with the body suspended. The curved body of the prepupa then straightened out. Soon a split occurred through the cuticle of the head, thorax, and first abdominal segments. The pupa worked its way downward and about two-thirds out of the larval skin, the last three abdominal segments remaining covered by the thoracic region of the exuvia. Here the pupa remained suspended, adhering to the larval integument, and attached to it by a pair of processes on the seventh abdominal segment. These processes fit into pockets on the first abdominal segment of the exuvia, at the base of the paired glands.

The larval glands previously mentioned are of the nature of osmeteria. These have not been studied, but the pouches into which they opened were found to be situated in the larval cuticula and are shed with the exuvia. Here they remain turgid with the fluid with which they are filled throughout ecdysis. Upon pressure, exvagination of the membrane in the throat of the tubercular openings takes place and the fluid flows out through the openings as in the living insect. Upon release of pressure, the membrane mechanically invaginates.

The pupa, upon emergence, is orange-colored underneath, with the rest of the body a light yellow. The sequence of pigmentation is as follows: spiracles of the abdomen, dorsal area of abdominal segments, legs, wing cases, edges of the thorax, and head. At the end of one hour and thirty minutes the pupa became glossy black.

Seven days later, July 19, the first adults emerged. On July 20, all had emerged.

The body of the adult, on emergence, is yellow, with the head, antennæ, legs, and center of the thorax black. The elytra are grayish white with the spots slightly pigmented. The wings are extended until thoroughly dry, when they are folded under the elytra. The lateral margins of the thorax are yellowish white, remaining so for several days, until the adult is finally matured and ready to mate.

A NEW ISCHNORRHYNCHUS

(Hemiptera: Lygæidæ)

BY E. P. VAN DUZEE

Ischnorrhynchus obovatus Van Duzee, n. sp.

Distinct from all our other species by its longer head and ovate elytra. Length, 4 mm.

Male. Head distinctly more produced than in *resedæ*, sides nearly rectilinear before the eyes; vertex regularly shallowly punctate; buculæ very narrow, scarcely elevated anteriorly. Rostrum attaining apex of fourth ventral segment; segment I surpassing base of head. Pronotum strongly punctate; broadly depressed just before the middle, sides sinuate, anterior margin one-half the posterior; callosities forming a smooth impressed arc either side; humeri prominent; scutellum coarsely punctate. Elytra broad, subhyaline, obscurely punctate on the median area, with a row of fine punctures on the basal half of the radial vein and next the claval suture; clavus with marginal and one median row of close punctures; costa ovately arcuate and reflexed, apex distinctly bent at radial vein; membrane nearly hyaline. Antennal segment I not attaining apex of tylus; II and IV slightly longer than III.

Color rufo-castaneous; tip of tylus, gula, segments I and IV of antennæ, and base and apex of II and III, black, tip of IV paler. Pronotum pale posteriorly, arcuate lines and hind margin blackish; scutellum castaneous. Elytra brownish subhyaline; dot at tip and a geminate dash on disk blackish. Beneath mostly blackish, varied with castaneous on the propleura; acetabulæ and orifices pale; pale margin of metapleura strongly produced at outer angle. Legs castaneous, knees and apex of tarsi black.

Holotype, male, No. 3003, and allotype, female, No. 3004, Museum California Academy of Sciences, taken by the author, April 30, 1922, on Cypress Ridge, Woodacre, Marin County, California, on Sargent's Cypress. Paratypes 3 males, 17 females, same data, 7 males and 3 females taken May 11, 1919, and two females taken by Dr. E. C. Van Dyke at same place, and three examples taken on Monterey Cypress at Carmel, March 24, 1919, and March 22, 1918, the latter by Mr. Louis Slevin. The ovate form and dark color recalls Gastrodes.

A NEW SPECIES OF ZOPHERODES FROM CENTRAL CALIFORNIA

(Coleoptera: Tenebrionidæ)

BY FRANK E. BLAISDELL, SR.

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The new species of *Zopherodes* described below is the first to be found north of San Francisco Bay, west of Mount Diablo meridian and about 38.5 degrees north latitude. *Parvicollis* Casey occurs as far north as Dalton Creek (Henry Dietrich) and the South Fork of the Kings River, in Fresno County. My remarks at the present time concern only Californian species. The known species of *Zopherodes* occurring in our fauna north of Mexico, have a wide range of distribution in the southwestern United States, inhabiting Southern and Lower California, Arizona, Texas, New Mexico, Nevada, and Utah.

Zopherodes sanctæhelenæ Blaisdell, n. sp.

Form oblong-oval, about three times as long as width of elytra, size variable and somewhat stout, prothorax and elytra almost equal in width, both narrowed basally, the bases equal to width of an elytron. Luster dull, color deep black as usual.

Head in repose deeply retracted into the prothorax, with eyes hidden from view, surface punctate.

Pronotum slightly wider than long, widest at middle, apex broadly and moderately deeply emarginate, angles rather prominent and well rounded; sides more or less angulate at middle; at apex of the antennal grooves broadly arcuate, most strongly so anteriorly where the margin is most prominent, very feebly reflexed and narrowly obtuse, posteriorly rather rapidly convergent to base with margin more rounded and granulate; base transverse, angles obtuse and not in the least prominent; disk moderately strongly and evenly convex, finely punctured, punctures small, scarcely submuricate, separated by a distance equal to two to four times their diameter, slightly denser in the vicinity of the angles where they become somewhat granulate. A feeble, narrow and transverse submarginal groove is present against the basal bead.

Elytra evenly oval, frequently slightly widest behind the middle to rarely subcylindrical, much more rapidly convergent anteriorly than posteriorly, humeri obsolete; sides broadly arcuate, apex obtusely and rather narrowly rounded, not lobed; apical tubercles somewhat elongate and well developed, parasutural impressions strong; disk moderately convex, most strongly so and rounded

laterally, arcuately declivous apically; surface with vermiculate lines which vary in distinctness, punctures rather small, very little larger and slightly stronger than those of the pronotum, similar in distribution, slightly muricate, most so laterally and apically, with few granules in the humeral area.

Prosternum densely and coarsely punctato-subtuberculate, likewise the meso- and metasternum, with their parapleuræ smooth and quite impunctate. Abdomen smooth and very sparsely punctate, punctures small; fifth ventral segment deeply impressed at base, impression bilobed apically. Legs moderate in stoutness and length.

Male. Epistomal area plane and deep velvety black, more finely punctate; abdomen more finely and sparsely punctate.

Female. Epistomal area more or less strongly impressed at apex and laterally, dull in luster as elsewhere, punctures stronger and a little larger. Abdominal punctures a little larger and stronger.

Measurements. Length (types), 16-19 mm.; width, 6-7 mm.

Holotype, male (No. 2986), and allotype, female (No. 2987), and eight paratypes in the Museum of the California Academy of Sciences. Thirty specimens studied, 13 males and 17 females.

Type locality: Mount St. Helena, Napa County, California. Collected on July 15, 1930, from under bark of a dead oak and pine, on the eastern and western slopes of the mountain, by Messrs. A. T. McClay, T. W. Serins and E. G. Linsley, who also possess paratypes.

The Academy's series of ten specimens give the following comparative measurements which show the degree of variations in size:

Specimen	Total Length mm.	Pronotum Length mm.	Pronotum Width mm.	Elytra Length mm.	Elytra Width mm.
1	13	4.5	5	9.5	6
2	15	5	6	10	6
3	15	5	5¾	10	6½
4	16	5	6	10.5	7
5	16	5	6	10	6
6	18	6	7	12	8
7	18	5.5	6.5	11	7.5
8	19	6	7	11	8
9	19	6	7	12	7
10	20	6.5	7	12	8

In the study of the sculptural characters of the species of Tenebrionidæ it is very essential to have the specimens per-

fectly clean, in order not to be deceived as regards luster and punctation. This can quickly be done with a soft camel's hair brush and chloroform. In the present study a number of the specimens were brighter than others, the application of chloroform removed an oily exudate and the specimens were really dull in luster. Unless this is done no reliance can be put on the statement luster bright or dull; likewise as regards fine punctation, the exudate obliterates the punctules.

In the classification of LeConte and Horn no mention has been made regarding the unusual size of the epistoma, which constitutes fully four-sixths of the exposed front of the head when retracted into the prothorax as in repose. The frontal sutures are directed obliquely backward and inward to just before the upper part of the eyes to arcuately unite in front of the narrow interocular surface. As a result the sides of the front appear as small lateral and irregularly triangular areas before the eyes. In only one specimen before me are the eyes exposed; these are transverse, finely faceted and separated above by a narrow interocular surface.

In *Zopherodes* as defined by Casey the antennal cavities are well rounded at apex, which point corresponds to the lateral subangulation of the pronotal margin. In all of the species the labrum is exposed, short, transverse, and densely punctured.

The species known to occur within the State of California may be recognized by the following synoptic statement of the essential differential characters:

Elytra subcylindrical, being abruptly narrowed at base and toward apex, pronotum strongly convex, generally very feebly impressed along the median line for a short distance at center.... 2

Elytra evenly oval in outline; pronotum less convex, never impressed on the median line..... 3

2. Pronotal punctures strong but not muricate, uneven in distribution, denser and coarser at the sides; elytra not wider than the prothorax, unevenly tuberculate, tubercles flattened and shining, sublineate; prosternum more clearly and discretely, very coarsely, punctate; abdomen coarsely punctate. Arizona (Nogales, VIII-9-06; Yuma, III-17-12; Prescott; Phoenix; Tempe Desert). Lower California. California (Laguna, San Diego County; Coachella Valley, Riverside County, V-9-27; Caliente, IX-15-89).....*tristis* Lec.

3. Form stout; pronotum coarsely, submuricately punctate, only slightly more closely so toward the sides; elytra evidently wider than the prothorax, finely, strongly and unevenly tuberculate, tubercles shining; prosternum irregularly, closely and muricately tuberculate; abdomen coarsely punctate. California (Julian, San Diego County; Mount Wilson, Los Angeles County, July, 1905).....*induratus* Casey

— Form more elongate; pronotum very coarsely and strongly (male) to moderately (female) muricately punctate, punctures slightly denser toward the sides, which are rounded; elytra rather finely but very irregularly, closely tuberculate, sculpture transversely and very unevenly rugulose; prosternum very unevenly punctato-tuberculate; abdomen moderately densely punctate, finer toward apex. California (San Diego County, Van Dyke collection; Hesperia, IX-24-13).....*ventricosus* Casey

— Body moderately stout, convex; pronotum coarsely, unevenly and not very sparsely punctate, punctures muricate or subtuberculate, not differing much at sides; elytra slightly wider than pronotum, sculpturing rough in irregular transverse plicæ, feebler, sparser, and mixed with some small and irregular tubercles toward side; prosternum rather closely punctato-tuberculate; abdomen not densely punctured throughout.....*californicus* Casey

— Form less stout than in *californicus,* more inflated posteriorly; pronotum rather sparsely and somewhat irregularly, moderately, coarsely punctate, punctures feebly muricate, closer, rather coarser and scarcely muricate laterally; elytra about as wide as prothorax, surface with moderate and somewhat sparse punctures, each attended by a small and feeble, slightly transverse tubercle, evenly distributed, not evidently lineate; prosternum irregularly and closely but not very strongly punctato-tuberculate; abdomen coarsely, moderately closely punctate, gradually less coarsely posteriorly. California (Fresno County: Dalton Creek, 4800 feet, VII-30-20; South Fork Kings River, VII-1-10; Herron Hill, II-28-92).....*parvicollis* Casey

— Form rather stout. Pronotum rather finely, sparsely punctate, slightly closer laterally, surface smooth, punctures not muricate; elytra finely, sparsely punctate, punctures feebly muricate, no tubercles, few granules about humeral area; abdomen very finely and extremely sparsely punctate; prosternum very irregularly, not densely punctate, centrally a few tubercles. California (Mount St. Helena, Napa County, July 15, 1930).....*sanctæhelenæ,* n. sp.

A BUENOA OF SOUTHWEST UNITED STATES AND MEXICO

(Hemiptera)

BY CLARENCE O. BARE
Sanford, Florida

The University of Kansas Science Bulletin, Vol. XVIII, page 342, and Plate LIV, No. 5, published in April 1928, figured the genital claspers and spine of the new species, *Buenoa arizonis* Bare, with the note that a full description would follow. Since that date we have secured and studied many more specimens. These include some from Arizona, Southern California, Lower California, and the State of Colima, Mexico. The following notes give the more complete description.

Buenoa arizonis Bare

Size: ♂ ♂, length 8.5 to 9 mm.; width 2.4 to 2.6 mm. ♀ ♀, length 8 to 8.9 mm., width 2.6 to 2.9 mm.

Color: Eyes dark; anterior part of scutellum and metathorax showing through elytra very dark or amber-colored; *hind margin of scutellum yellowish;* notocephalon, prothorax, legs, and underside of body mostly yellowish or straw-colored; ventral part of abdomen except outer portions of connexiva and median carina dark; tips of front and intermediate tarsal claws black; considerable red coloring about wing attachments.

Structural characteristics: Head with eyes slightly narrower than pronotum at hind margin. Notocephalon slightly sulcate in some specimens, narrowest ventrad of vertex, widest between vertex and synthylipsis which are subequal in width. *Tylus full and knob-like as seen in profile, a slight depression or division at the point of the knob in the males.* Synthylipsis: vertex: base of tylus :: 9: 9: 12 in ♂; in ♀ as 9: 11: 12.

Pronotum with slight knob-like prominence at anterior angle; of smooth swollen appearance in ♀; distinctly tricarinate in ♂; hind margin very slightly sinuate; one-fifth wider than long in ♂; nearly one-half wider than long in ♀.

Scutellum about one-eleventh shorter than pronotum; relatively somewhat shorter in ♀ than in the ♂; anterior portion smooth and shining black.

Pronotum: scutellum: claval orifice: elytral suture: membrane :: 6.5: 5: 1.2: 6: 9 in ♂, and :: 5: 5.5: 1.2: 7: 9 in ♀.

Seventh abdominal tergite of ♂ with lateral (sinistral) spine as in Fig. 7, fairly long and slender.

Gonapophyses of ♂ as in Figs. 5 and 6.

Pleurite of second abdominal segment in ♂ with glandular opening darkly chitinized.

Foreleg: Coxa of ♂ with usually one large stridular seta and a setal vortex near base; trochanter angulate; femur with a small setal comb at distal cephalad angle, on lateral face about eighteen crib-forming setæ; on mesal face in ♂, stridular area and setæ as shown in Figs. 1 and 2. Tibial prong in ♂ with about fifty-one setal teeth. Tarsus with setal comb near base of digitate black-tipped claws.

Middle leg: Distal half of coxa coated with many fine setæ; on mesal face of femur a distinct row of forty-five to fifty tooth-like setæ, besides the many large crib forming setæ; at distal end of tibia two setal combs of about five setæ in each; also a setal comb at distal end of second tarsal segment opposite the somewhat falciform claws; inner face of tarsus in both segments armed with short setal claws arranged mostly in groups of three.

Hind leg: *Caudal margin of femur armed with two rows of short dentate setæ, about seventy in upper or dorsad row and sixty in lower or ventrad row;* setal comb almost circumscribing distal end of tibia; setal comb about one-third distance from proximal end of first tarsal segment and between the two rows of long swimming setæ on mesal face.

Relative lengths of parts of legs vary, but are nearly as follows:

	Front Femora	Middle Femora	Hind Femora
For ♂ ♂	4.9	7	10.8
For ♀ ♀	4.5	8	11

	Femur	Tibia	Tarsus 1	Tarsus 2
Front leg	4.5	6	2.8	1.7
Middle leg	8	6.6	3	2
Hind leg	11	10.5	4	3.5

Type locality: Superstition Mountains, Arizona (Pinal County). See Tech. Bull. 7, Univ. of Arizona Agr. Exp. Sta., pp. 148-9.

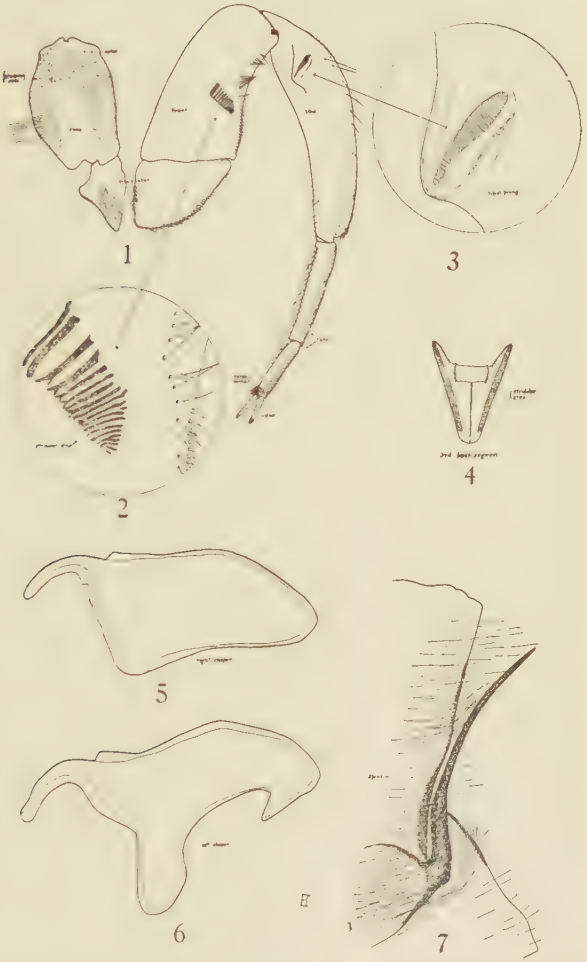

Fig. 1. Foreleg, left: Low power micro., from holotype, slides Nos. 1 and 2 (x 22).

Fig. 2. Stridular area of front femur: High power micro., from holotype, slide No. 2 (x 94).

Fig. 3. Tibial prong showing stridular detail: High power micro., from holotype, slide No. 2 (x 94).

Fig. 4. Third beak segment with prongs bearing stridular areas: Low power micro., from paratype No. 3, slide No. 1 (x 22).

Fig. 5. Right genital clasper: High power micro., from holotype, slide No. 5 (x 94).

Fig. 6. Left genital clasper: High power micro., from holotype, slide No. 5 (x 94).

Fig. 7. Sinistral spine of seventh abdominal tergite: High power micro., from holotype, slide No. 4 (x 94).

Types: Described from 151 specimens, 52 ♂ ♂ and 99 ♀ ♀. Holotype ♂, allotype ♀, and paratypes (3 ♂ ♂ and 10 ♀ ♀) Nos. 1-3, 5-13, and 92, from Superstition Mountains (Pinal County), Arizona, dated November 7, 1922, and collected by P. A. Glick. The holotype is made up in five slide mounts of which Nos. 4 and 5 are those from which the original drawings in the University of Kansas Science Bulletin, Vol. XVIII, Plate LIV, No. 5, were made. Some of the paratypes are made up in slide mounts as follows: No. 1 (2 slides); No. 2 (2 slides); No. 3 (pinned specimen and 1 slide); No. 6 (1 slide); No. 14 (2 slides); No. 92 (2 slides). Paratypes, 39 ♂ ♂ and 79 ♀ ♀, Nos. 4, 14-17, 30-91, 93-143, from Santa Cruz, Cochise, and Gila counties, Arizona; and Santa Rita Mountains, in Pima County, Arizona; dates July 25, 29, and August 4, 5, 6, 24, 1927; collectors, R. H. Beamer, P. A. Readio, and L. D. Anderson. Paratypes, 3 ♂ ♂ and 5 ♀ ♀, Nos. 18-25, Boboquivaria Mountains, Pima County, Arizona; (1898?); collector, F. H. Snow. Paratypes, 3 ♂ ♂, Nos. 144-146, Warsaw, Arizona, December 4, 1893, U. S. National Museum, Accession No. 28058. Paratype, 1 ♂, No. 148, Catalina Mountains, Arizona, "18/4," Sabino Canyon, Hubbard collection. Paratypes, 1 ♂ and 3 ♀ ♀, Nos. 26-29, Escondido Bay, Baja California, June 14, 1921; collector, J. C. Chamberlin; ex. Coll. Cal. Acad. Sciences. Paratypes, 1 ♀, No. 147, State of Colima, Mexico, L. Conradt Coll. Paratype, 1 ♂, No. 149, Lower California, P. R. Uhler collection. (This specimen also bears the label, "*Anisops platycnemis* Fieber, det. Uhler.")

Location of types: In University of Kansas, Snow collection: Holotype, allotype, and paratypes, Nos. 18-25, 30-91, 93-143. In author's collection: paratypes, Nos. 1-17, 28, and 92. In California Academy of Sciences collection: paratypes, Nos. 26, 27, and 29. In U. S. National Museum: paratypes, Nos. 144-149.

Comparative notes: Easily distinguished from similar species by distinctive coloration of scutellum, the number of setæ on hind femora, and especially by the knob-like projection of the tylus. *Buenoa antigone* Kirk. and *Buenoa carinata* Champion are similar, but both have fewer setæ on the hind femora and lack the knob on the tylus.

SOME NEW LEAFHOPPERS OF THE GENUS ALIGIA

(Rhynchota: Homoptera)

BY E. D. BALL

University of Arizona, Tucson

The members of this genus are nearly all western and especially southwestern in distribution. They all possess the two cross nervures, numerous reticulations and a concave suture between the ocelli apparently bounding the front. Van Duzee recently described three species from California, and this paper adds five forms from Arizona. The North American species may be roughly divided into groups as follows:

A—Elytra, and general color, pale or milky with fuscous or dark brown nervures.

B—Vertex angulate disk nearly flat..... *inscripta* Van D., *californica* Van D., *colei* Van D., and *descripta* Ball

BB—Vertex rounding disk convex..... *jucunda* Uhl., *munda* Ball, *oculea* Ball, and *dellana* Ball

AA—Elytra, and general color, tawny or golden, the nervures concolorous or darkening posteriorly.

C—Ground color of basal half of elytra pale or subhyaline. Transverse bands pale or wanting..... *modesta* O. and B., *occidentalis* Van D., and *manitou* Ball

CC—Ground color of basal half of elytra tawny to dark testaceous nervures obscure. Bands usually definite, ivory .....*turbinata* Ball, *chiricana* Ball, and *santana* Ball

Aligia descripta Ball, n. sp.

Resembling *inscripta*, but longer, darker with a shorter and transversely furrowed vertex. Length, 5 mm.

Vertex shorter and narrower than in *inscripta* with an obtusely rounding apex and a deep transverse furrow, longer and narrower than in *jucunda* which it otherwise resembles. Front broader above than in *jucunda*, definitely convex in both diameters instead of being concave beneath the produced apex of vertex as in *inscripta*. Elytra longer and narrower than in *inscripta*. Venation similar in pattern, much more heavily inscribed than in *jucunda*. The inscriptions along costa numerous and fairly regular.

Color: Vertex creamy, with a pair of round dots at apex, a transverse band widening in the middle and the median line connecting this band with a basal triangle fuscous, a pair of brown dashes against the eyes and a spot on the disk on either side brown. Pronotum heavily inscribed with fuscous. Scutellum creamy, a pair of large brown spots at the base, a median line and a pair of lateral

dark spots on the apical triangle. Elytra ivory, the veins and numerous vermiculate lines fuscous, two pale transverse bands indicated.

Holotype, female[1] and allotype, male, Glenn Oaks, Arizona, July 19, 1929, and five pairs of paratypes from Glenn Oaks, Granite Dells and Yarnell Heights, Arizona, taken by the writer from July to October, 1929.

Aligia manitou dellana Ball, n. var.

Slightly larger and much darker than typical *manitou* with concolorous males. Resembling *jucunda,* but much smaller. Length, 4.-4.5 mm.

Vertex slightly longer and more definitely angled than in *manitou.* This is accentuated by a dark transverse band back of the ocelli and two definite dark spots on the apex. The elytra are ivory subhyaline with dark nervures as in *jucunda,* without any trace of banding. The males are exactly the same color as the females, while in *manitou* they are an almost uniform golden yellow in sharp contrast.

Holotype, female, Glenn Oaks, October 7. Allotype, male, Granite Dells, October, 6, and ten paratypes taken with the types and at Yarnell Heights, October 8. All taken by the writer in 1929. This may well be a distinct species in the strikingly different males, but if so, then it is probable that a third species is still being confused.

Aligia turbinata Ball, n. sp.

Similar to *manitou* in structure, slightly larger with a sloping vertex. Mahogany with a broad white band, a dark head and apex of elytra. Length, 4-5 mm.

Vertex sloping, one-third longer on middle than against eye. Head very obtusely conical. Elytra flaring, opaque with the venation obscure to the anteapical cells, few transverse veinlets in the anteapicals.

Color: Vertex black, shading out posteriorly. Ocelli white, pronotum, scutellum, and anterior half of elytra rich, shining reddish brown. A broad, opaque, waxy, white transverse band across the second cross nervure. This band narrowly margined with smoky and a heavy smoky band running obliquely from apex of clavus across the three inner apical cells. The anteapical cells and part of the two outer apicals subhyaline with reddish or smoky nervures. Face smoky, the margins black; below pale, the pygofers reddish.

Holotype, female, and allotype, male, Glenn Oaks, Arizona, July 29, 1929, and one male and eleven female paratypes taken with the types and at Yarnell Heights by the writer in July and August.

[1] Types in the collection of the author.

Aligia chiricana Ball, n. sp.

Longer and more slender than *manitou* which it resembles. Elytra delicate milky subhyaline, female, or golden subhyaline, male, with concolorous nervures on basal half. Length, 4.2-5 mm.

Vertex shorter and slightly more conical than in *manitou*, shorter and less conical than in *turbinata*. Elytra longer and less flaring than in *manitou*. Claval nervures without cross nervure, central anteapical cell broader but less reticulate, usually four short nervures to costa, while in *manitou* there are three.

Color: Female, vertex creamy with faint traces of the usual markings. Pronotum irregularly marked with wavy brown lines. Scutellum washed with dusty orange, omitting three ivory points at apex. Elytra delicate milky subhyaline with concolorous nervures. Three pairs of black points on clavus, each anterior to a nervure and increasing in size posteriorly. A narrow band across the second cross nervure in which the nervures are smoky or brown, and the membrane ivory. Male golden with the smoky nervures and markings of female, face and below pale creamy.

Holotype, female, allotype, male, and six paratypes, Chiricahua Mountains, Arizona, July 6; also two pairs of paratypes, Huachuca Mountains, Arizona, June 15, all taken in 1930 by the writer. This is a strikingly distinct species with a delicate coloring hard to describe.

Aligia santana Ball, n. sp.

Size and form of *chiricana* nearly, slightly stouter with a more rounding vertex. Smaller and narrower than *modesta* with a broad white band. Length, 4.5-5 mm.

Vertex broad and uniformly rounding, the margins parallel, in *chiricana* and *modesta* the vertex is slightly produced. Elytra, in shape and venation resembling *chiricana*, not as flaring or reticulate, especially along costa, as in *modesta*. Color, pale smoky brown with three pale areas as follows: The vertex, the apex of scutellum and adjacent margins of the claval areas and a broad and definite ivory band across the second cross nervure. There is also a triangular subhyaline area extending in from the first and second apical cells of the elytra. The vertex and face are creamy with the usual pale markings. Three pairs of dark triangles and usually a pair of white dots along the suture. The apical veinlets are fuscous and a smoky cloud occupies the central apical cell.

Holotype, female, Santa Rita Mountains, Arizona, June 22, 1930, allotype, male, the same locality in July and five female paratypes taken by the writer from these mountains June to September. This species approaches *turbinata* in the banded effect, but is easily separated by the triple banding and the short vertex.

A NEW ÆOLOTHRIPS FROM NEVADA WITH NOTES ON THREE OTHER SPECIES FOUND IN CALIFORNIA

BY DUDLEY MOULTON

Aeolothrips aureus, Moulton, n. sp.

Female holotype: Color bright golden yellow, including legs, with head and thorax orange yellow, extreme tip of abdomen brownish and hind tibiæ brownish in the middle. Antennal segments one to three yellowish, two slightly darker, three brown at extreme tip, four brownish yellow shading darker in outer third, five to nine brown. Fore wings with two irregular, light brown cross bands, otherwise clear yellow. Hind wings without transparent bands. Crescents of ocelli reddish orange. Prominent spines at tip of abdomen dark brown.

Measurements: Total body length 1.7 mm.; head, length .16 mm.; width .20 mm.; prothorax, length .15 mm., width .26 mm. Segments of antennæ: length (width) I, 23 (36); II, 50 (28); III, 100 (26); IV, 70 (23); V, 66 (23); VI, 20 (20); VII-IX, 48 microns; total length, 382 microns.

Head and thorax without conspicuous spines or markings. Ocelli well developed. Antennal segments seven to nine subequal and together with six about as long as segment four. Anterior longitudinal vein of fore wing with thirty-two and hind vein with twenty-five regularly placed extremely small transparent setæ. The only prominent body spines are found at tip of abdomen.

Male allotype: Colored as in the female but with fifth antennal segment lighter in basal half, also with a dark brown spot in the middle of eighth abdominal segment and the median portions of ninth and tenth brownish. The clasping organs on segment nine dark brown. Prominent terminal spines brownish yellow.

Measurements: Total body length 1.3 mm. Segments of antennæ: length, I, 16; II, 46; III, 86; IV, 56; V, 56; VI, 20; VII-IX, 48 microns; total length, 338 microns.

This species belongs in the *fasciatus* group of the genus which has two distinct cross bands on the fore wings and is most closely related to *gloriosus* Bagnall, but is readily distinguished by its larger size and different coloration. The ninth and tenth abdominal segments and eighth tergite are entirely black in *gloriosus* and the distal portions of antennæ are black.

Type material: Female holotype; male allotype; twenty-nine female and eight male paratypes taken in the flowers of a composite, April 8, 1930, by Professor E. O. Essig (M. No. 4178). Types in author's collection and at the University of California, Berkeley, California.

Type locality: Las Vegas, Nevada.

Cryptothrips rectangularis Hood

Mr. A. T. McClay of the University of California has reported finding many black thrips with their red-colored larvæ in the burrows of a Scolytid beetle, *Micraces hirtellus,* Lec., the lead cable borer, in a dead Linden tree on the Berkeley campus. Collections were made when they were first observed in November, 1929. The tree was subsequently cut up and held for observation of the beetles. Mr. Steinweden with Mr. McClay examined the burrows again in May, 1930, and found that all of the thrips were gone, giving evidence that they had only been hibernating in the burrows. The November collections included two species, *Cryptothrips rectangularis* Hood and *Doccessissophothrips animus* Moulton. *C. rectangularis* Hood, was first found under the dead bark of peach trees at Urbana, Illinois, and later one specimen was taken by Dr. H. E. Burke under bark at West Yellowstone, Colorado. Mr. McClay's observations now extend the habitat of this insect to California (Moulton, No. 3882).

Docessissophothrips animus Moulton

Four specimens of this insect were collected in the same burrows with *C. rectangularis* Hood. Three other specimens have been known up to the present time, one taken by sweeping nettles at Mountain View, California, and two from Corvallis, Oregon (Moulton, No. 3882).

Pœcilothrips ornatus Hood

This species was originally taken from under bark of a red-oak tree in Washington, D. C., and later on hickory trees at Harrisburg, Penn., and Macedon, New York. Professor E. O. Essig recently found both adults and larvæ of this insect under bark of a live oak tree on the Berkeley campus, which extends its habitat to California (Moulton, No. 4236).

A LIST OF THE PENTATOMIDÆ OF ZION NATIONAL PARK, UTAH

BY LOWELL A. WOODBURY
University of Utah

I was enabled to make this study through the courtesy of Mr. A. M. Woodbury, the Park naturalist, who has very generously made the Park collection of Hemiptera available to me for study. Dr. V. M. Tanner of the Brigham Young University has also very kindly loaned me several rare specimens from this locality.

To Dr. R. V. Chamberlin I am indebted for aid and for many valuable suggestions in preparing this list.

Mr. W. L. McAtee of the United States Biological Survey and Mr. Robert L. Usinger of Oakland, California, have very kindly checked or identified most of the material herein listed. Mr. E. P. Van Duzee very generously checked the determination of *Brochymena hoppingi* Van Duzee.

Unless otherwise noted, Mr. A. M. Woodbury is the collector of all specimens recorded.

**Brochymena hoppingi* Van Duzee. One female specimen collected May 17, 1922, by V. M. Tanner.

**Brochymena sulcata* Van Duzee. Quite common. Collected at various times of the year. Hibernates under the dead bark of cottonwood trees in this locality.

Peribalus abbreviatus Uhler. Very rare.

Peribalus limbolarius Stål. Quite common. In the specimens before me the color varies from a dark form tinged with black through one somewhat rufous to a very pale form.

Rhytidoloma faceta (Say). This has never been collected in Zion National Park, but occurs in the same general region at St. George, Utah, and should be found there.

Chlorochroa sayi Stål. This pretty little bug, which is quite common in this locality, varies a great deal in color pattern, from a very profuse to an almost obsolete white spotting on the

hemelytra. The membrane at times assumes a purple tinge. I also have a specimen of this from Bryce Canyon, National Park, Utah, collected by V. M. Tanner.

Carpocoris remotus Horv. One specimen from this locality. Quite rare.

**Euchistus inflatus* Van Duzee. Fairly common.

**Menecles incertus* (Say). Very rare. I have one specimen from this locality and one from St. George, Utah.

**Thyanta perditor* (Fabr.). Quite common. The pronotal band is lacking in all specimens from this locality and the color of the sides of the prothorax, the humeral spines, and the tip of the scutellum vary in color from green to deep red. The general color of the individuals as a whole varies from a light green through a blue green to a deep green. One specimen is a straw yellow.

Thyanta custator (Fabr.). Very common. I have swept this bug quite commonly from Nightshade (*Solanum nigrum*) during July and August. The color pattern varies much the same as in *perditor,* but the pronotal band varies from obsolete to very prominent.

Acrosternum hilaris (Say). I swept one specimen of this species from the Large-toothed Maple (*Acer grandidentatum*) at the Narrows of this Park on April 24, 1930.

Banasa dimidiata (Say). Fairly common.

**Banasa euchlora* Stål. Rare. I have also collected this species at Pipe Springs, Arizona, about ten miles from the Utah-Arizona boundary, but in the same general region.

Dendrocoris contaminatus (Uhler). One specimen collected May 17, 1922, by V. M. Tanner.

Perillus bioculatus (Fabr.). Occurs at St. George, Utah. Not collected in Zion, but may be there.

**Podisus maculiventris* (Say). The specimens of this species from this locality range from a light brown to a very dark color. In some of the specimens the ventral line of spots on the abdomen and the spots on the femur are partially or entirely obsolete.

Zicrona cærulea Linn. Very rare.

* Species not listed from Utah in Van Duzee's catalogue.

TWO NEW SPECIES OF BARK BEETLES OF THE GENUS PHLŒOSINUS CHAPUIS

(Coleoptera, Scolytidæ)

BY C. R. BRUCK
Berkeley, California

While critically studying the bark beetles of western North America, I have noted that two of the species in the genus *Phlœosinus* were new. As the members of this genus are of considerable economic importance, I feel that these should be made known as soon as possible.

Phlœosinus variolatus Bruck, n. sp.

Large, 2.5-4 mm. long, robust, dark reddish brown to black species. Head with front granulate-punctate, a deep median concavity surrounded by pubescence in the male, the depression shallow in the female and with sparse pubescence, the carina short, extending longitudinally beyond the median area of the concavity, with a short tubercular elevation at the base of the carina; antennal club twice as long as wide, the sutures moderately oblique; eyes strongly margined. Prothorax wider than long, densely, moderately coarsely punctate and somewhat pubescent, sides arcuate, very slightly sinuate anteriorly, base broad. Elytra longer than wide, striæ wider than intervals and grossly, variolately punctured, the intervals shining, slightly rugose and with a double row of small alternating punctures, with a hair arising from each puncture; first, third, fifth, seventh and ninth intervals uniseriately serrate, serrations of first interval just attaining the crest of the declivity in the male and the apex of the elytra in the female, face of the declivity in the former flat with sparse scale-like pubescence, first interval greatly widened, shining, transversely rugose, second much narrowed, with scale-like pubescence, third densely serrate with large serrations, fourth much narrowed with scale-like pubescence and met by the sparsely, moderately serrated fifth, seventh and ninth intervals and the shining and narrowed sixth and eighth intervals. The striæ of the declivity are much narrower than on the disk and the punctures greatly reduced in size. Beneath rather densely clothed with long pile.

The female, as indicate above, has the front less pubescent and less concave than the male and the serrations of the first elytral interval attain the apex. In addition the first, third, fifth, seventh and ninth intervals are uniseriately serrate, the first and third with the serrations numerous and of moderate size and globular, the fifth, seventh and ninth more sparsely serrate, with the serrations smaller,

the even intervals have a few minute tubercles as far as the declivity, the fifth, sixth, seventh and ninth intervals meet the fourth, and the flatter portions of the declivity are densely clothed with a scale-like pubescence.

This large species is one of the most distinct because of the gross strial punctuation. It would follow *cupressi* Hopk. in Swaine's[1] key.

Holotype No. 2993, allotype No. 2994, Mus. Calif. Acad. Sci., and a number of designated paratypes, collected on Mount St. Helena, California, February 29, 1931, by E. F. Wohletz and myself, from beneath the bark of dead Sargent Cypress, *Cupressus sargenti* Jepson. A pair of paratypes will be sent to Dr. Swaine for the Canadian National Museum, one pair placed in the collection of Dr. Van Dyke, deposited in the California Academy of Sciences, one pair in the collection of Mr. Wohletz and the remainder in my own collection. A very long series of specimens has been studied, three in the collection of the California Academy of Sciences, taken by Mr. E. P. Van Duzee, October 31, 1923, others by Mr. Wohletz and myself from Mount St. Helena, and a long series taken on Mount St. Helena and on Cedar Ridge, Alameda County, California.

Phlœosinus aciculatus Bruck, n. sp.

Of moderate size, 2.0-3 mm. in length, slender, black with elytra generally reddish brown.

Head, male: Front densely punctate-granulate and shallowly impressed or almost flat; female with front convex, sparsely pubescent and with a few long hairs at the epistomal margin, the frontal carina in male barely visible at the middle of the impressed area, obliterated in the female; eyes strongly margined; antennal club twice as long as wide, the sutures slightly oblique. Prothorax somewhat wider than long, base broad and bisinuate, sides arcuate, sinuate anteriorly, disk densely, moderately coarsely punctate and somewhat pubescent. Elytra longer than wide, striæ deep and well defined laterally, less defined on the disk; the intervals, on the contrary, wide and distinctly aciculate on the disk and less aciculate on the sides; striæ sparsely, finely punctate, the punctures deeper on the sides than on the disk, first interval but slightly wider than the

[1] Canadian Bark Beetles, Pt. II, by J. M. Swaine, Bull. 14, Ent. Br., Dept. Agr., Ottawa, Canada, p. 69, 1918.

discal striæ, the others quite wide; pubescence moderate and short; declivity on the male smooth and shining; interspaces uniformly wide, first, third, fifth, seventh and ninth uniseriately serrate; the serrations of the first are few, distant and acute, of the third, smaller, more numerous, closer and acute, of the fifth, seventh and ninth, still more reduced in size and number and less acute; declivity in the female with scale-like pubescence, first interval with a row of moderately large, widely spaced and acute serrations, also a secondary series of very small serrations, more or less limited to the crest of the declivity, the second interval with fewer, smaller and more widely spaced acute serrations arranged uniseriately, the third with a greater number of closely spaced acute serrations, smaller than those of the first but equal to those of the second interval and uniseriately arranged; fifth, sixth, seventh, eighth and ninth with a few, small, widely spaced and acute serrations arranged uniseriately, those of the fourth with the aciculations somewhat more prominent at the crest. Legs and underside of body densely clothed with short pubescence.

The female, as indicated above, has the front convex, the declivity clothed with scale-like pubescence, the serrations decidedly smaller, more numerous; each interspace provided with some serrations, none being smooth, the first having a few smaller serrations at the side of the larger ones at the crest of the declivity and, as in the male, the fifth, sixth, seventh, eighth and ninth meet the fourth.

This moderately sized species is most distinct because of the densely aciculated disk and the general aciculations of the sides, the smooth declivity of the male, and the pubescence of the legs and ventral surface. It would follow *juniperi* Sw. in Swaine's [2] key.

Holotype, No. 2995, and allotype, No. 2996, Mus. Calif. Acad. Sci., and a number of designated paratypes, collected in the Chiricahua Mountains, Cochise County, Arizona, August 8, 1916, by V. W. Owen, probably from juniper. A pair of paratypes will be sent to Dr. Swaine for the Canadian National museum, a pair in my collection and the remainder in the collection of Dr. Van Dyke, deposited in the California Academy of Sciences. A series of twenty-four specimens have been studied, all from the collection of Dr. Van Dyke, taken by V. W. Owen.

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2 Canadian Bark Beetles, Pt. II, by J. M. Swaine, Bull. 14, Ent. Br., Dept. Agr., Ottawa, Canada, p. 69, 1918.

A NEW SPECIES OF PLATYLYGUS

(Miridæ, Hemiptera)

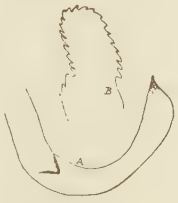
BY R. L. USINGER

Oakland, California

The species herein described was taken by the author while collecting in the National Parks of the western United States during the summer of 1930. The utmost coöperation was received in all of the parks and a keen interest was shown in the subject of entomology. For the holotype from the collection of the California Academy of Sciences I am indebted to Mr. E. P. Van Duzee after whom the species is named in appreciation of the patience and help he has shown me in the study of Hemiptera. The reader is referred to a paper by H. H. Knight[1] for a discussion of the species of this genus and illustrations of the genitalia.

Platylygus vanduzeei Usinger, n. sp.

Differs from the other species of this genus by its lighter color; flavo-testaceous, marked with rufous on the head, callosities, and cuneus, and fuscous on the pronotum and elytra. Scutellum yellow, the base and apex yellowish white. Male genital clasper and chitinous tip of the œdeagus distinctive of the species.



A, left clasper, dorsal aspect; *B*, chitinous tip of œdeagus.

Male. Length, 7 mm. Head more nearly vertical than in *P. grandis* Kngt.; clypeus with two longitudinal fuscous vittae; front strongly convex as contrasted with *grandis* where it is somewhat flattened; anterior portion very broad at base with the cheeks rectilinear or nearly so, the cheeks distinctly arcuate in *grandis* forming an anterior lobe. Oblique striations tinged with rufous; longitudinal sulcus obscure or wanting, the area flattened with the oblique striations arising from it. Pronotum with the anterior median triangular spot extending between the callosities, and lateral angles fuscous; a posterior median area extending from near the lateral angles to the posterior joining of the callosities fulvous-brown, with a narrow longitudinal median pale line. The rest of the pronotum, including the callosities, yellow; the callosities large, contiguous, attaining the anterior margin, polished, marked with irregular rufous lines. Lateral margins evidently sinuate; rectilinear or slightly arcuate in *grandis*. Posterior lobe of the scutellum with the base and apex yellowish white; median portion flecked with

1 Bulletin of the Brooklyn Entomological Society, Vol. XIII, p. 16, 1918.

rufous. Hemelytra flavo-testaceous; clavus infuscated near the apex of the scutellum; corium with a broad maculate area at middle, extending toward the apex, fuscous; embolium translucent and immaculate; cuneus in great part sanguineous. Second segment of the antennæ becoming fulvous apically, third fulvous to fuscous, fourth entirely fuscous. Rostrum almost attaining the hind margin of the intermediate coxæ; surpassing the middle of the posterior coxæ in *grandis*. Venter yellow with the sides of the ventral segments tinged with sanguineous; the genital segment with a reddish brown, basal triangular mark either side of the middle. Femora flecked with rufous.

Female uniformly lighter, the black markings of the pronotum less conspicuous and the oblique markings of the corium confined to a smaller area. Rostrum almost attaining the hind margin of the posterior coxæ; distinctly surpassing the posterior coxæ in *grandis*.

Holotype, male, No. 2997, Mus. Calif. Acad. Sciences, collected by C. D. Duncan, June 17, 1921, at the Grand Canyon, Arizona, and *allotype*, female, No. 2998, Mus. Calif. Acad. Sciences, collected by the author in Grand Canyon National Park, Arizona, South Rim, June 29, 1930. *Paratypes*, twelve females taken at Mesa Verde National Park, Colorado, July 6, 1930, by the author.

Butterflies of Los Angeles County

It is a pleasure to record the appearance of Mr. Gunder's list of the "Butterflies of Los Angeles County, California.[1] This list enumerates 178 forms, representing 123 recognized species, the remaining 55 being subspecies (here termed races), transitional, seasonal or sexual forms or hybrids. Mr. Gunder has worked out the complicated relationship of these various categories as well as can be done with our present knowledge of that fauna. A perusal of this list would be of interest to anyone studying intraspecific variation. In this paper Mr. Gunder does not recognize aberrations. Probably he has placed the significant among these in other categories to which he has assigned them. This list, with that by Mr. W. S. Wright [2] on the "Butterflies of San Diego County," gives a very complete insight into the butterfly fauna of coastal southern California.—E. P. Van Duzee.

[1] Bulletin of the Southern California Academy of Sciences, XXIX, pp. 39-95, August 1930.

[2] Trans. San Diego Soc. of Natural Hist., VI, pp. 1-40.

CHERMIDÆ FROM UTAH, NEVADA, AND ARIZONA, INCLUDING THREE NEW SPECIES

(Homoptera)

BY F. D. KLYVER

San Mateo Junior College, San Mateo, California

The specimens on which the following article is based were collected by Mr. E. W. Davis, United States Bureau of Entomology, Richfield, Utah, and were received through the courtesy of Mr. P. N. Annand, Sugar Beet Insect Investigations, United States Bureau of Entomology.

Incidental to other work being carried on by Mr. Davis fifty-five separate collections were made by sweeping twenty-three species of host plants[1] in southern Nevada, southwestern Utah, and northwestern Arizona between April 20 and June 21, 1930. The entire collection includes approximately twelve hundred specimens representing four of the six subfamilies recognized by Crawford: namely, the Liviinæ, Pauropsyllinæ, Triozinæ, and Psyllinæ. Three of the fourteen species represented are apparently undescribed and three of them are here undeterminable because of insufficient and fragmentary material.

One or more slide mounts of cleared and stained specimens have been prepared for each species represented. In several instances where the material was limited my preference has been to mount the available material on slides for detailed study with the compound microscope rather than to rely on unmounted specimens in making determinations. For most of the species specimens for making other mounts are available.

The writer has undertaken an extensive study of the Chermidæ and is interested in receiving specimens from any part of the world for identification. With few exceptions the immature stages of the Chermidæ are little known. Material including nymphs and a sufficient number of adults to establish the identity of the immature stages will be especially appreciated. Types of the new species are in the author's collection.

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1 A statement of the writer's viewpoint relative to the host plants of the chermids and an evaluation of the several methods of collecting commonly employed will be found elsewhere (1930, Klyver, F. D., Notes on the Chermidæ. Part I. Canadian Entomologist, 62:167-168).

Subfamily Liviinæ

Genus Aphalara Forster

Crawford's opinion that this genus contains a large number of closely related and probably intergrading species is substantiated by my observations on numerous specimens included in the collection. My observations, furthermore, confirm his statement that the size and color of the body, the presence, absence or degree of maculation or coloration of the fore wing, and the size of the genital segments are subject to considerable variation even within single species. On the other hand, my specimens definitely indicate that there are other characters, usually disclosed only in *properly cleared, stained, and mounted specimens studied with the compound microscope,* which are more significant and of greater utility in separating the species than are the admittedly variable characters mentioned above. These other characters are: (1) the morphology of the fore-wing and hind wind, that is, the character of the wing membrane, the presence or absence and distribution of setæ, punctations and alar radulæ,[2] and the character of the venation of the hind wing; (2) the shape or form and detailed structure of both the male and female genital segments; (3) the comparative size of the anal valve or proctiger and the forceps or claspers of the male; (4) the shape or form of both the proctiger and the claspers of the male; and (5) the presence or absence of, the exact form of, and the location or distribution of the various types of setæ, spines, hooks, and chitinized ridges or folds that characterize the male and female genitalia in this group. In addition to these characters the ovipositor of the female is itself frequently distinctive.

Relying chiefly on these latter characters, the numerous specimens at hand, obviously agreeing very well with the characters of the genus Aphalara, have been assigned to eight species. One of these, *Aphalara pulchella* Crawford, is apparently subject to few variations and is easily recognized. An-

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2 Ferris, G. F., and Klyver, F. D. Report Upon a Collection of Chermidæ (Homoptera) from New Zealand. New Zealand Journal of Technology. In press.

other species, *A. suaedæ* Crawford, is, on the other hand, apparently subject to wide and significant variations. It is of special interest here because of the bearing my observations have on the group of species centering around *A. artemisiæ* Forster. Two apparently undescribed species of this genus which are represented by sufficient material are here described as new.

Aphalara suaedæ Crawford

Fig. 1, A, B, C, D, H

1914, *Aphalara suaedæ* Crawford. U. S. Nat. Mus., Bull. 85:31; fig.

Specimens. Over 350 adult males and females and three last-stage nymphs from *Dondia nigra* (Raf.), Overton, Nevada, May 2, 1930 (311 [3]); nine males and females from the same host, Las Vegas, Nevada, May 2, 1930 (316); three males from the same host, Las Vegas, Nevada, May 3, 1930 (322); many males and females from the same host, Glendale, Nevada, May 2, 1930 (303); three females from *Covillea tridentata* (D. C.), St. Thomas, Utah, May 2, 1930 (309); one male from *Atriplex hastata* L., Logandale, Nevada, May 2, 1930 (304).

Length to tip of folded wing, 1.6-2.2 mm.; length of body mounted on slide, 2.5 mm.; length of fore wing, 1.4-1.8 mm.; width of fore wing, .6-.8 mm.; width of head, .5-.75 mm.

Comparisons of specimens of this long series with many specimens taken by the writer from *Suaeda moquini* Greene, east of Altamont Pass, Alameda County, California, and from the same host at several localities in the San Joaquin Valley, California, point to their being identical. The fact that the three nymphs listed above are also apparently identical with numerous fifth-stage nymphs taken in the Altamont Pass collections, together with the rest of the life history of the species, is further and conclusive proof of the identity of the specimens in the Davis collection.

It is exceedingly interesting, furthermore, that the numerous specimens before me apparently include all of the variations on which have been based the descriptions of several supposedly distinct species. Certainly the color variations given by Crawford for *Aphalara artemisiæ* Forster, *A. angustipennis* Crawford, *A. viridis* Crawford, *A. pinicola* Crawford, and

[3] Unless otherwise specified the numbers in parentheses are the collection numbers of E. W. Davis.

A. suaedæ Crawford are found in these specimens. Furthermore, with the exception of those for *A. angustipennis,* the measurements derived from these specimens might apply to any of the species here listed. Except for some variations in size, and this means gross size, the genitalia are said by Crawford to be similar for all of these species. This is a further indication of the possibility that the species are identical, since the genitalia, most frequently those of the male, are the most reliable single character separating the closely related species of this genus. From careful study of my specimens, both mounted and unmounted, and from Crawford's descriptions, I regard it as entirely probable that *A. viridis* Crawford, *A. pinicola* Crawford, and *A. suaedæ* Crawford are the same species. *A. angustipennis* Crawford may be a distinct but very closely related species, and *A. artemisiæ* Forster is probably a different but similarly a closely related species.

Aphalara pulchella Crawford

1911, *Aphalara pulchella* Crawford. Pomona Journ. Ent., 3:480.

Specimens. One female from *Dipetalia linifolia* (Vahl), Las Vegas, Nevada, May 3, 1930 (323); and two males and one female from *Salsola pestifer* A. Nels., St. George, Utah, May 17, 1930 (360).

These specimens are in general agreement with the description of the species except for the dimensions of the female genitalia. The measurements of the two females at hand, both of which are mounted on slides, are .3 mm. and .35 mm. for the genital segments, .5 mm. and .6 mm. for the abdomens. In other words, the genital segment is scarcely one-half as long as the rest of the abdomen when the measurements are taken from specimens with the abdomen expanded instead of from specimens that have dried and hence shrunken.

Aphalara gutierreziæ Klyver, n. sp.

Fig. 1, P

Specimens. Forty-four males and females from *Gutierrezia sarothræ* (Pursh), Las Vegas, Nevada, April 20, 1930 (228); thirty-seven males and females from the same host, Las Vegas, Nevada, May 3, 1930 (328); six females from the same host, Glendale, Nevada, May 18, 1930 (408); and, one male and one female from *Gutierrezia lucida* Greene, St. George, Utah, May 1, 1930 (292).

Types. Holotype, male, FK 224.1.1 ♂, from *Gutierrezia sarothræ* (Pursh), Las Vegas, Nevada, May 3, 1930 (328); allotype, female, FK 224.2.1 ♀.

Adult. Length to tip of folded wing, 2.2-2.5 mm.; length of body mounted on slide, 1.5-1.7 mm.; fore wing, 2.0-2.2 mm.; width of fore wing, .75-.8 mm.; width of head, .5-.6 mm. General color of all males at hand (twenty-one males) very constant; head and thorax black including eyes and antennæ, legs and abdomen green, fore wings very light brown with the veins darker brown, especially toward the apex. General color of the females slightly more variable; general green color with yellowish or light brown markings to a general light brown color throughout, wings with membrane light brown to darker brown with faint brown spots over the apical two-thirds, veins distinctly brown; tip of abdomen dark brown. Characters of the genus well developed.

Head slightly wider than prothorax, scarcely deflexed. Antennæ ten-segmented; one-fourth longer than width of head.

Thorax distinctly arched; the dorsum scarcely or very slightly pubescent, with very fine hair-like setæ. Posterior tibia with eight black teeth at the apex; two rather small claws on the basal tarsus of the hind legs. Anterior wings hyaline to very slightly opaque, somewhat fumate in the apical portion and faintly spotted apically, the veins usually distinctly brown; shape and venation very similar to that of *A. veaziei* Patch. Posterior wing very delicate in texture, beset throughout with very small punctations, the venation scarcely discernible, developed as irregular rows of minute punctations.

Abdomen with the plates moderately chitinized. Genitalia of the male (Fig. 1, P) relatively large; the "body"[4] of the proctiger being about equal to its vertical length (*p*), the length of the lobes (*l*) slightly greater than *p*, the lobes wide at the base and subacute at the apex, being distinctly expanded dorsad in lateral aspect. Female genitalia very similar to those of *A. suaedæ* Crawford in every respect except for their slightly smaller size.

Nymph. Unknown.

Aphalara minutistylus Klyver, n. sp.

Fig. 1, G, L, M, N, O, I

Specimens. More than two hundred males and females from *Artemisia filifolia* Torr., St. George, Utah, April 21, 1930 (264).

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4 The comparative measurements here indicated are taken as shown in Fig. 1, H and I; "p" is the greatest vertical length of the proctiger; "b" is the length of the "body" of the proctiger; and "l" is the length of the lobe of the proctiger measured from the posterior extremity of "b." The value of these comparative dimensions is apparent from a consideration of their application to the two proctigers illustrated.

Types. Holotype, female, FK 227.1.1 ♀, from *Artemisia filifolia* Torr., St. George, Utah, April 21, 1930 (264); allotype, male, FK 227.1.1 ♂.

Adult. Length to tip of folded wing: male 2.0 mm., female 2.5 mm.; length of body on slide: male 2.5 mm., female 2.6 mm.; length of fore wing: male 1.5 mm., female 2.0 mm.; width of head: male .5 mm., female .6 mm. General color of both males and females green to pale yellowish brown throughout, with white to pale brown markings on the thorax, apex of female genital segment very dark brown to black. Antennæ light colored with the tip slightly darkened. Fore wings slightly opaque with numerous sharply delimited dark brown spots, sometimes closely crowded on the apical third of the wing. Characters of the genus well developed.

Head as wide as thorax; somewhat deflexed. Antennæ ten-segmented, the third segment as long as the first and second combined; antennæ slightly but distinctly longer than the width of the head.

Thorax arched; without pubescence. Posterior tibia with five to six large black teeth at apex; two claws on the basal tarsus. Anterior wing (Fig. 1, L) slightly opaque, punctate over the entire membrane, with many brown spots (Fig. 1, M) distributed irregularly as shown in the figure; venation as shown in illustration. Posterior wing rather large but exceedingly delicate in structure, beset throughout with numerous very minute points, the venation scarcely discernible, developed as rows of points that are hardly visible even with the higher power of the microscope.

Abdomen with the dorsal plates somewhat more heavily chitinized than the ventral. Genitalia of the male (Fig. 1, N, O) relatively large; *b* of the proctiger very nearly equal to *p*, the lobes over one-fourth longer than *p*, of uniform width in lateral view and broadly rounded at the apex; the proctiger having two unusually large heavily chitinized, and meso-dorsally directed hooks at the base of the lobes; claspers distinctly longer than *p*. Genital segment of female scarcely more than one-half the length of the rest of the abdomen; the anterior half of the segment twice as thick as the posterior half, this being easily seen even in unmounted specimens studied with low magnifications (Fig. 1, G); the anterior half of the dorsal valve bearing a number of large setæ as illustrated; the apex of the dorsal valve being roughened and heavily chitinized, the ventral valve terminating in a strongly chitinized black apex.

Nymph. Unknown.

This species is evidently very closely similar to *A. angustipennis* Crawford. It is here described as a new species because of its smaller size; the different proportions of the fore wing; and the distinctive character of the male and, especially, the female genitalia. It differs in several important respects from *A. veaziei* Patch. It is clearly different from *A. veaziei metzaria* Crawford on the basis of the male, but more importantly the female genitalia, which are as distinctive or more so than those of any species in this difficult group.

Aphalara spp.

Specimens. One female from *Sophia pinnata* (Walt.) Howell, Ely, Nevada, May 19, 1930 (2531). One male from *Chrysothamnus speciosus* Nutt., seventeen miles northwest of Milford, Utah, May 15, 1930 (2502). One female from *Chrysothamnus speciosus* Nutt., Littlefield, Arizona, May 3, 1930 (342).

These three specimens are undeterminable without additional representation because of their somewhat fragmentary condition. Each represents a species different from the species in this and other collections of the writer.

Subgenus Anomocera Crawford

1914, *Anomocera,* Crawford. U. S. Nat. Mus., Bull. 85:36-37.

This interesting group is represented by several specimens in this collection. The antennæ, upon casual observation, certainly appear to be but eight-segmented. The only perfect antenna in my material is suggestive of *two* very short segments being fused to the eighth segment instead of only one as indicated by Crawford.

Aphalara (Anomocera) minutissima Crawford

Fig. 1, J, K

1914, *Aphalara (Anomocera) minutissima* Crawford. U. S. Nat. Mus., Bull. 85:37; figs.

Specimens. One female from *Dipetalia linifolia* (Vahl), Las Vegas, Nevada, May 3, 1930 (323); two males and seven females from *Artemisia filifolia* Torr., St. George, Utah, April 21, 1930 (264).

Male genitalia with the proctiger of the general type represented by *Aphalara suaedæ* Crawford, but less robust, with the lobes relatively longer and bearing a number of stout, sharply

pointed setæ; the claspers, as illustrated (Fig. 1, J, K), nearly as long as the proctiger. Female genitalia similar to those of *A. suaedæ* Crawford, but somewhat larger, with the valves of the ovipositor more than usually extended posteriorly.

Genus Aphalaroida Crawford

1914, *Aphalaroida* Crawford. U. S. Nat. Mus., Bull. 85:38.

This very interesting genus is represented by a single

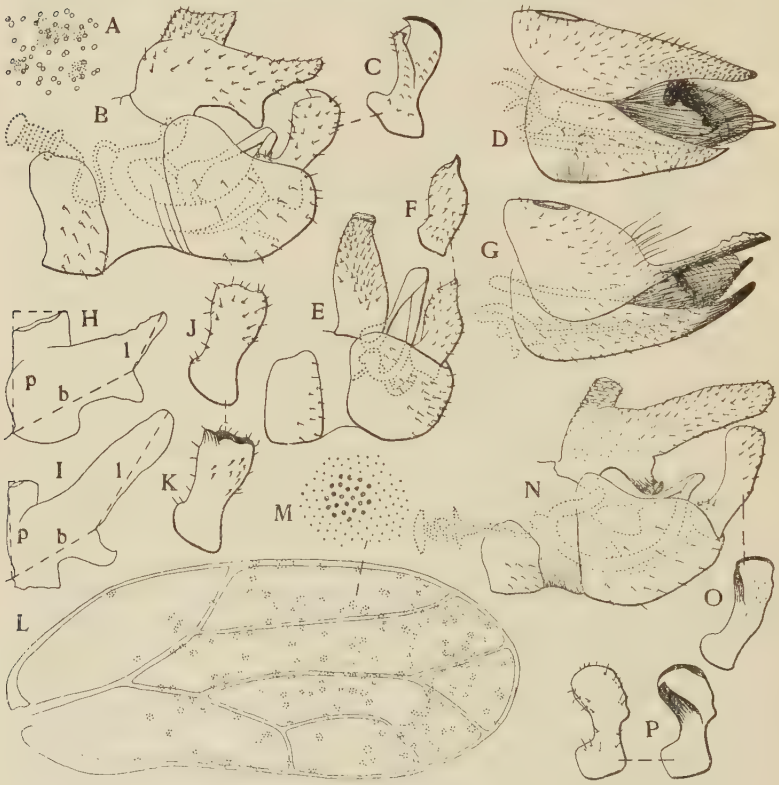

Fig. 1. *Aphalara suaedæ* Crawford—*A,* detail of fore wing; B, genitalia of male; *C,* inner face of clasper; D, genitalia of female; *H,* proctiger, illustrating method of taking measurements. *Psyllia breviata* Patch—*E,* male genitalia; *F,* inner face of clasper. *Aphalara minutistylus* n. sp.—*G,* genitalia of female; *L,* fore wing; *M,* detail of wing; *N,* genitalia of male; *O,* inner face of clasper; *I,* proctiger. *Aphalara gutierreziæ* n. sp.—*P,* outer and inner aspects of clasper of male. *Aphalara (Anomocera) minutissima* Crawford—*J, K,* outer and inner aspects of clasper of male.

species and but a single, somewhat fragmentary male specimen. All but the first and second antennal segments are wanting, the posterior wings, and parts of all the legs except one posterior leg, which is complete, are wanting.

In many respects the specimen at hand fits Crawford's description of *Aphalaroida pithecolobia* Crawford, the generic type, particularly in the anterior wing form and in the male genitalia. In other respects it is closely similar to *A. inermis* Crawford, especially in wing coloration, which here seems significant.

Aphalaroida intermedia Klyver, n. sp.

Fig. 2, A, B, C, D, E, F, G, M

Specimen. A single male specimen from *Covillea tridentata* (D. C.), St. Thomas, Nevada, May 18, 1930 (405).

Type. Holotype, male, FK 233.1.1 ♂, from *Covillea tridentata* (D. C.), St. Thomas, Nevada, May 18, 1930 (405).

Adult. Length of body on slide, 2.1 mm.; width of head, .5 mm.; length of fore wing, 1.5 mm.; width of fore wing, .65 mm. General color pale brown throughout. Wings semiopaque, light brown.

Head (Fig. 2, M) slightly wider than width of thorax; eyes prominent; antennæ unknown; vertex and genæ bearing many large, blunt-ended setæ, the genæ bearing several other longer and sharply pointed setæ.

Thorax somewhat arched; the dorsum and the sides bearing many large setæ similar to those found elsewhere on the head, wings, and ventral plates of the abdomen. Legs with many large, chiefly sharply pointed setæ; apex of posterior tibia (Fig. 2, F) with three large black teeth mesally and a single large tooth and several large pointed setæ on the opposite side; basal tarsus with two relatively large black claws. Anterior wing having shape and venation as shown in illustration (Fig. 2, A); the wing membrane bearing large setæ similar to those found on the head, thorax, and ventral plates of abdomen, and having an intricate system of markings as illustrated (Fig. 2, B), more or less punctate over the entire membrane; five alar radulæ developed extensively, but rather feebly, in the two marginal cells, between R_1 and R_s, R_s and M_{1+2}, and M_{3+4} and Cu_1 (Figs. 2, A, C). Posterior wing unknown.

Abdomen with the plates quite heavily chitinized; the dorsal plates bearing an irregular row of small pointed setæ along the posterior margin; the ventral plates bearing many large setæ of the type found on the head, thorax, and fore wings. Male genitalia

(Fig. 2, D, E) moderate in size; the proctiger simple, somewhat elongate; the claspers about half as long as the proctiger, subrectangular in lateral aspect, the apex notched, the anterior process short, broadly rounded, the posterior process flattened on top. Female genitalia unknown.

Nymph. Unknown.

Aside from the difference in general proportions, differing from *A. pithecolobia* Crawford, to which it is apparently closely related, in the pronotum being distinctly arched; in the anterior wing being conspicuously spotted, with the *wing membrane* bearing relatively large setæ, set biseriately with the veins but always on the wing membrane at some distance from the veins (Fig. 2, A, B, C, G). Similar to *A. pithecolobia* Crawford in the proctiger of the male being considerably longer than the claspers, the proctiger being relatively stout instead of very long and slender as in that species.

The general appearance of the anterior wing is apparently similar to that of *A. inermis* Crawford. On the other hand, the specimen at hand differs from that species in the following particulars: in the fore wing being relatively broader and less rhomboidal; in the white markings of the fore wing being uniform in size and distributed over the entire wing surface; in the presence of small white areas at the ends of R_s, M_{1+2}, and M_{3+4}, and Cu_1, and a small but very noticeable dark brown spot at the end of Cu_2 (Fig. 2, A); and in the pterostigmal vein (R_1) being more complete, delimiting a longer pterostigmal area.

Subfamily Pauropsyllinæ

Genus Heteropsylla Crawford

1914, *Heteropsylla* Crawford. U. S. Nat. Mus., Bull. 85:44.

This genus is represented by over three hundred adult specimens of *Heteropsylla texana* Crawford, the type of the genus, and by two last-stage nymphs of this species.

Heteropsylla texana Crawford

Fig. 2, N

Specimens. More than three hundred adult males and females and two last-stage nymphs from *Prosopis glandulosa* Torr., Overton,

Nevada, May 2, 1930 (315); and, adults only, from *Artemisia dracunculoides* Pursh, St. George, Utah, May 3, 1930 (347); from *Sophia pinnata* (Walt.) Howell, Ely, Nevada, May 19, 1930 (2530); from *Pluchea sericea* (Nutt.) Coville, Glendale, Nevada, May 3, 1930 (338); from *Corton longipes* Jones, Littlefield., Arizona, May 3, 1930 (340); from *Covillea tridentata* (D. C.), Littlefield, Arizona, May 3, 1930 (344); and from *Chrysothamnus speciosus* Nutt., Littlefield, Arizona, May 3, 1930 (342).

In all of the more important characters my specimens agree very closely with Crawford's description of the species. In coloration they differ considerably, there being a predominance of bright green color in the abdomen and frequently over the entire body in the long series of specimens before me. In several instances of specimens with the head, thorax, and the dorsum of the abdomen nearly black the abdomen is dark, yet distinctly green on the ventral side.

Aside from the coloration the morphology of the fore and hind wings is noteworthy. The membrane of the anterior wing is covered with small points, the alar radulæ being feebly developed in the two marginal cells and between M_{3+4} and Cu_1; the veins bearing small setæ; and the pterostygma is thickened and beset with numerous punctations. The posterior wing is exceedingly delicate in texture, the venation being scarcely discernible with the compound microscope, consisting of a series of minute punctations arranged in two rows; the antero-proximal margin bearing a number of relatively large, stout, setæ.

The claspers of the male are deeply notched at the apex, with the posterior process somewhat longer than the anterior, as described by Crawford, but neither is, strictly speaking, acute at the apex (Fig. 2, N). The anterior process is roundly pointed; the posterior process is flattened at the apex and has a small antero-mesally directed hook as shown in the illustration.

Nymph. The immature stage in my material will be described in the series of short papers by the writer devoted to the descriptions of the immature stages of generic types and others of special interest.[5]

5 1930, Notes on the Chermidæ. Part I. Can. Ent., 62:167-175; pl. 14; 1930, Part II. Ibid. In press.

Subfamily TRIOZINÆ
Genus PARATRIOZA Crawford

This genus is represented by one commonly known species. The information here given extends the description by Crawford in several important details.

PARATRIOZA COCKERELLI Sulc.

Fig. 2, H, I, J

1909, *Paratrioza cockerelli* Sulc. Acta Soc. Ent. Bohemiæ, 6:102-109.
1914, *Paratrioza cockerelli* Sulc. Crawford, U. S. Nat. Mus., Bull. 85:71-72; figs.

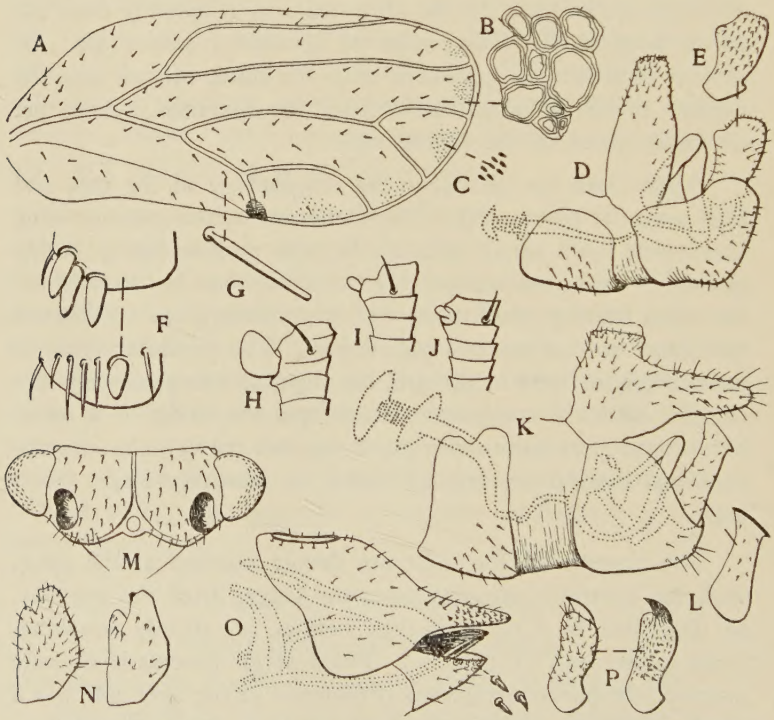

Fig. 2. *Aphalaroida intermedia* n. sp.—*A*, fore wing; *B*, detail of wing membrane; *C*, alar radulæ; *D*, genitalia of male; *E*, inner face of clasper; *F*, inner and outer aspects of apex of posterior tibia; *G*, seta of wing membrane; *M*, head. *Paratrioza cockerelli* Sulc—*H*, *I*, and *J*, distal ends of fourth, sixth, and eighth antennal segments, respectively. *Trioza lobata* Crawford—*K*, genitalia of male; *L*, inner face of clasper. *Heteropsylla texana* Crawford—*N*, outer and inner aspects of clasper of male. *Psyllia minuta* Crawford—*O*, genitalia of female; *P*, outer and inner aspects of clasper of male.

Specimens. Numerous males and females; from *Covillea tridentata* (D. C.), Glendale, Nevada, April 20, 1930, May 3, 1930 (242; 332, 330); from *Erigonum trichopes* Torr., Glendale, Nevada, May 3, 1930 (331); from *Chrysothamnus paniculatus* (A. Gray), Glendale, Nevada, May 3, 1930 (333); from *Hymenoclea salsola* Torr. and Gray, Las Vegas, Nevada, April 20, 1930 (219); from *Norta altissima* (L.) Britton, Milford, Utah, May 20, 1930 (2557); from *Chrysothamnus speciosus* Nutt., St. George, Utah, May 1, 1930 (282); from *Lepidium scopularum* Jones, Garrison, Nevada, May 15, 1930 (2509); from the same host, Tonopah, Nevada, May 18, 1930 (2525, 2526); and from *Sophia pinnata* (Walt.), Ely, Nevada, May 19, 1930 (2528, 2530, 2531).

Observations with the compound microscope (100 x and 440 x) reveal the very interesting and unusual structure on antennal segment four which has been mentioned by Crawford. In addition to the one on this segment, however, similar though smaller structures are found on segments six and eight as illustrated in Fig. 2, H, I, J.

The posterior wing of this species, hitherto undescribed, is very thin, transparent, and delicately membraneous with the venation obscure, the veins present as a single row of minute, rather widely spaced punctations, the membrane covered throughout with exceedingly fine punctations.

Trioza lobata Crawford

Fig. 2, K, L

1914, *Trioza lobata* Crawford. U. S. Nat. Mus., Bull. 85:86-87; figs.

Specimen. One adult male from *Chrysothamnus speciosus* Nutt., Panaca, Nevada, May 19, 1930 (2538).

This species is represented by a single imperfect specimen, of which the antennæ are wanting. There can, however, be no question as to its identity because of the distinctive anterior wings and other characters.

The alar radulæ of the anterior wings are moderately developed in the two marginal cells and between M and Cu_1. Posterior wings relatively large, very thin and membraneous, with the venation weakly developed as irregularly set single and double rows of punctations, and with the general surface of the membrane beset with minute points arranged in circles of varying sizes suggesting lacework.

Male genitalia (Fig. 2, K, L) as described by Crawford. His figures of the genitalia lack definiteness and clearness.

(To be Continued)

THE PAN-PACIFIC ENTOMOLOGIST

Published quarterly by the Pacific Coast Entomological Society
in co-operation with the California Academy of Sciences

E. P. Van Duzee, Editor S. B. Freeborn, Treasurer

Editorial Comment

In a review of Dr. Howard's very interesting and valuable work, *A History of Applied Entomology,* recently published as Volume 84 of the Smithsonian Miscellaneous Collections,[1] Professor Cockerell has called attention to the disproportionate emphasis heretofore placed upon the purely economic side of the entomological activities of the United States Government. I say "heretofore" advisedly, as there recently have appeared indications of a more suitable recognition of the importance of purely systematic work in the management of the National Museum and of the Bureau of Entomology. Speaking of the prompt and efficient help he had received from the Imperial Institute of Entomology at London, in the determination of certain oriental material, Professor Cockerell says "this work could not have been done in America, or could only have been done with extreme difficulty. The United States National Museum has not yet accepted its responsibility for the development of an adequate collection of the insects of the world." Again he says: "It is at this point that we sense the weakest aspect of modern American entomology. There are in Washington and in the experiment stations and universities many capable workers. But as a general thing they are intellectually dissipated by a multiplicity of duties. They may be well paid and not overworked, but they cannot concentrate on comprehensive research." This is essentially true of every scientific institution I know in this country. The available material may be ample, but the staff of specialists is pitifully small and entirely inadequate to study this material and to make it available through the publication of monographs or the determination of species for those to whom determinations are important. Professor Cockerell's review should be read by all those responsible for shaping the policies of our scientific institutions.—E. P. Van Duzee.

1 Science for February, 1931.